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Indian Standard
SPECIFICATION FOR MARQUENCHING OILS
(First Revision)

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NEW DELHI 110002

Gr 2

April 1977

Indian Standard

SPECIFICATION FOR MARQUENCHING OILS

(First Revision)

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Indian Standard
SPECIFICATION FOR MARQUENCHING OILS
(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 12 January 1977, after the draft finalized by the Lubricants and Related Products Sectional Committee had been approved by the Chemical Division Council and Mechanical Engineering Division Council.

0.2 This standard was originally published in 1967. The present revision has been prepared as a result of review of the standard in the light of the present day requirements of this material. Taking into consideration the views of producers, users and technologists, the Sectional Committee responsible for the preparation of this standard felt that it should be related to the prevailing trade practices followed in the country in this field. This consideration led the Sectional Committee to base this standard on the data made available to the Committee by the producers and users on the currently marketed marquenching oils.

0.3 Marquenching is a steel hardening process to produce finished products of high precision and quality from relatively less expensive low alloy steels. The finished products include gears, tools, dies, bearing races, etc.

0.4 The process of marquenching essentially consists of rapid hot quenching of the finished products in baths maintained at about 200°C to ensure temperature equalization throughout the steel before conversion to the martensite structure during subsequent air or water cooling.

0.5 The oil suitable for marquenching should have a high and constant quench rate along with satisfactory steel hardening characteristics. It should have high flash point and low volatility to minimize fire hazards. It should also have a high degree of thermal stability and resistance to oxidation and sludging. During the quenching operation, it should not excessively fume or froth or produce sticky deposits on the quenched products which are not easily removable.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for marquenching oils.

2. REQUIREMENTS

2.1 General

2.1.1 The material shall consist of refined mineral oil with or without additives.

2.1.2 The material shall be homogeneous and free from water, suspended matter, dust, sediment and any other visible impurities.

2.2 Specific Requirements

2.2.1 The material shall comply with the requirements prescribed in Table 1, when tested according to the methods prescribed in the relevant appendix to this standard and 'P' series of IS: 1448†. Reference to the relevant methods of test is given in col 4 and 5 of Table 1.

3. PACKING AND MARKING

3.1 Packing — The material shall be packed in securely closed metal drums and containers of appropriate size and strength as agreed to between the purchaser and the supplier.

3.2 Marking — Each container shall be marked with the following information:

- a) Name of the material;
- b) Manufacturer's name, initials or trade-mark, if any;
- c) Quantity of the contents; and
- d) Batch number and year of manufacture.

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*Rules for rounding off numerical values (*revised*).

†Methods of test for petroleum and its products.

TABLE 1 REQUIREMENTS FOR MARQUENCHING OILS

(*Clause* 2.2.1)

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
			Appendix	P : of IS : 1448*
(1)	(2)	(3)	(4)	(5)
i)	Flash point, Cleveland (open) cup, °C, *Min*	230	—	P : 69
ii)	Kinematic viscosity at 98·9°C, cSt	14 to 20	—	P : 25
iii)	Viscosity index, *Min*	80	—	P : 56
iv)	Pour point, °C, *Max*	0	—	P : 10
v)	Viscosity ratio after oxidation, *Max*	1·5	—	P : 65
vi)	Volatile matter at 200°C for 2 h, percent by mass, *Max*	1·0	A	—
vii)	Sulphur, percent by mass, *Max*	2·5	—	P : 33
viii)	Crackle test	To pass the test	B	—
ix)	Copper strip corrosion for 3 h at 100°C	Not worse than No. 1	—	P : 15

*Methods of test for petroleum and its products.

3.2.1 The containers may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in IS : 1447-1966*.

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*Methods of sampling of petroleum and its products.

4.2 Number of Tests

4.2.1 Tests for kinematic viscosity and crackle test shall be conducted on each of the individual samples.

4.2.2 Tests for all other characteristics given in Table 1 shall be conducted on the composite sample.

4.3 Criteria for Conformity

4.3.1 For crackle test the lot shall be considered to have met the requirements for this test if each of the individual samples passes the test.

4.3.2 For kinematic viscosity, the average ($\bar{x}$) and range (R) shall be calculated from test results on the individual samples. The lot shall be considered to have satisfied the requirements for this characteristic if the expression $\bar{x} \pm 0{\cdot}6\,R$ lies within 14 to 20.

4.3.3 In respect of each characteristic tested on the composite sample the lot shall be declared to meet the requirement if the test result on the composite sample satisfies the corresponding requirement.

4.3.4 The lot shall be declared as conforming to the requirements of this specification if **4.3.1**, **4.3.2** and **4.3.3** are satisfied.

APPENDIX A

[*Table* 1, *Sl No.* (vi)]

DETERMINATION OF VOLATILE MATTER

A-1. PROCEDURE

A-1.1 Weigh 10·00 ± 0·05 g of oil in a glass petri-dish of approximately 80 mm diameter and 15 mm height. Keep it in a draught-free electric oven for 2 hours at 200 ± 0·5°C. After this period reweigh the petri-dish.

A-2. CALCULATION

$$\text{Volatile matter, percent by mass} = \frac{S - M}{S} \times 100$$

where

S = initial mass in g of sample, and

M = mass in g of sample, after the test.

APPENDIX B

[*Table* 1, *Sl No.* (viii)]

CRACKLE TEST

B-1. PROCEDURE

B-1.1 Place a sample of oil in a clean dry test tube about 125 mm long and 1 mm diameter, in sufficient quantity to fill the test-tube to one-quarter of its depth, care being taken that the oil is not in an aerated condition. Heat the test tube containing the oil rapidly on a silent flame until the oil commences to boil during which process crackling shall not be detectable.

B-1.1.1 The material shall be considered to have passed the test if no audible indication of free moisture by cracking is observed.

INDIAN STANDARDS ON LUBRICANTS AND RELATED PRODUCTS

IS:	
317-1970	Automotive hydraulic brake fluid, moderate duty (*second revision*)
408-1973	Grease No. 0, graphited (*first revision*)
493-1958	Machinery and spindle oils
496-1973	Internal combustion engine lubricating oils, heavy duty (*second revision*)
506-1973	Automotive grease (*first revision*)
507-1970	General purpose grease (*first revision*)
508-1973	Grease, graphited (*second revision*)
719-1974	Antifriction bearing grease (*first revision*)
720-1974	Locomotive greases (*second revision*)
958-1975	Temporary corrosion preventive, grease, soft film, cold application (*first revision*)
1012-1958	Steam turbine lubricating oils
1083-1957	White oil, light, technical
1088-1975	Lubricants for wrist watches, clocks, clock like mechanisms and precision instruments (*first revision*)
1115-1973	Oil, cutting, soluble (*first revision*)
1118-1957	Gear lubricant, multipurpose (extreme pressure gear oil)
1153-1975	Temporary corrosion preventive, fluid, hard film, solvent deposited (*first revision*)
1154-1957	Temporary corrosion preventive, fluid, soft film, solvent deposited, water displacing
1277-1975	Gear lubricant, regular (*first revision*)
1589-1960	Oil, cylinder
1628-1971	Oil, axle (*first revision*)
1674-1960	Temporary corrosion preventive, fluid, soft film, solvent deposited
1758-1975	Jute batching oil
2297-1975	Gear lubricants, compounded (*first revision*)
2660-1964	Oil, cylinder, grade 4
2664-1974	Quenching oil (*first revision*)
3065-1970	Cutting oil, neat (*first revision*)
3098-1975	Oil hydraulic, mineral oil type (*first revision*)
4543-1977	Marquenching oils (*first revision*)
4578-1968	Lubricating oils for refrigeration machinery
5730-1970	Volatile corrosion inhibitor powder
6048-1970	Temporary corrosion preventive, soft film, hot-dipping type
6049-1971	Code of practice for application of temporary corrosion preventives
6050-1971	Temporary corrosion preventives, strippable, hot-dipping type
6263-1972	VCI treated paper
6552-1972	Straight mineral high demulsibility oils
7029-1973	Code of practice for inhibition of corrosion of internal combustion engine coolant water
7514-1974	Grease, low temperature
7623-1974	Lithium soap greases
7895-1975	Test, for fire-resistant characteristics of hydraulic fluids used in mining machinery

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg.1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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